DOCUMENT RESUME

ED 250 654 CS 007 803

AUTHOR Langer, Judith A.; Purcell-Gates, Victoria
TITLE Knowledge and Comprehension: Helping Students Use What They Know.
PUB DATE [84]
NOTE 33p.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Elementary Secondary Education; *Knowledge Level; *Prior Learning; *Reading Comprehension; *Reading Diagnosis; *Reading Instruction; Schemata (Cognition); Student Evaluation; *Teaching Methods
IDENTIFIERS *Pre Reading Plan

ABSTRACT

Noting that many prereading discussions lead teachers to "mis-estimate" students' prior knowledge about a particular topic, this paper describes the Pre-Reading Plan (PReP) designed to help both students and teachers become aware of what students already know about a specific topic. Following an introduction, the first portion of the paper explores why some frequently used teaching practices may fail to prepare students adequately to read their textbooks. The major part of the paper describes the three phases of the PReP activity, suitable for students in grades three through twelve in all subject areas, and requisite preparation for the activity. The final part of the paper discusses assessing student knowledge during the activity and provides examples of the PReP being used with several different types of reading material at different grade levels. (HTH)

Knowledge and Comprehension: Helping Students Use What They Know

Judith A. Langer
Stanford University

Victoria Purcell-Gates
University of California, Berkeley

This chapter will address a problem common to teachers of all subjects. Whether in science, social studies, literacure or mathematics, textbooks are often difficult for students to understand. Although teachers use a variety of pre-reading activities to prepare students, we continue to seek new ways to help them comprehend the textbook material we ask them to read.

A series of results from our research studies (Langer 1980, 1981, 1982, 1984a,b) have led us to rethink the notion of pre-reading discussions. Many such discussions lead us to mis-estimate what students know about a particular topic--to believe that students know more (or less) about a particular topic than they actually do. If students offer the response we expect, it is easy to assume they understand, and if they give a response we do not understand or did not expect, it is too easy to assume they don't understand. To really understand what students know and mean requires discussion, and in particular discussion in

which students and teachers listen to one another.

Our work suggests that students have a rich background of life's experiences that can help them understand even highly technical academic prose. However, too often this potentially useful knowledge is expressed in personal (home talk) language as opposed to academic (school talk) language. The words and ideas that come to the students' minds may not be the responses teachers expect when asking pre-reading questions. Early in their school lives, students learn that their home-talk associations are not likely to be what the teacher is looking for, and begin to withhold their ideas -- ideas they might otherwise use to make sense of the technical material they read in school.

In this chapter, we will present a pre-reading activity designed to help both students and teachers become aware of what students already know about a specific topic. This activity, called the Pre-Reading Plan (PReP), can be used with students in grades 3-12, in all subject areas. Before presenting the activity, let us first explore a bit more deeply why some frequently used teaching practices may fail to prepare students to read their textbooks.

Vocabulary Review

Picture, if you will, a fourth-grade classroom in which a group of students have been assembled for a pre-reading activity to prepare them to read a social studies chapter on

"Forms of Government." The teacher, following the suggestions in his teacher's guide, has placed ten vocabulary words from the chapter on the board. He is now attempting to find out if any of his students can "say what the words mean."

Teacher: Who can tell us what "democracy" means?

(A few hands are tentatively raised while the rest of the students gaze abstractedly, if somewhat anxiously, at their desks.)

Teacher: Joseph?

Joseph: My daddy belong to the democracy party!

Teacher: You mean the democratic party. That's nice. Anyone else? Joannie?

Joannie: Democracy is...I don't know (sigh).

Teacher: Anyone else? OK. James?

James: Democracy is the form of government of our government!

Teacher: Very good! That's right--democracy is a form of government.

Teacher: Now, who can give us a new sentence, using your own words, to include the word democracy?

Now, let us examine this fairly typical scenario. First, what was the purpose of this activity? Why did the teacher ask the vocabulary definition question? What knowledge did he expect to tap -- or teach? In this case,

he wished to get the students ready to read the chapter. He wanted to be certain they were introduced to the technical words they did not already know (or to be reminded of the meanings they only partially knew) before meeting them in the text.

This justification presupposes (1) that teachers can get someone ready for a thinking activity simply by adding new knowledge, and (2) that students who are told the meaning of a word will then be able to comprehend that word upon seeing it in a text.

Outside-In and Inside-Out Instruction

The first assumption implies a passive stance on the part of the student, as if a teacher can help students learn by assigning them to find definitions and then use the new words in sentences. In this sort of teacher directed (outside-in) activity students are expected to accept new words much as children accept having rainboots put on, by adding new parts to the outside frame. This view of the learner as a passive recipient of information has been rejected by decades of cognitive research (Piaget, 1954; Neisser, 1976; Anderson, 1977; Rumelhart, 1977). We know that learning is in large part directed from the inside out. The student comprehends new ideas by (1) relating the new to ideas, experiences, and language that

already make sense to that individual, and (2) by stretching these already-held meanings in an attempt to understand the new. Meanings are not constructed outside the student's background of knowledge by guessing definitions and putting words into sentences. Any activity which presupposes a passive stance on the part of the learner is doomed from the start.

The second assumption, that the meaning of a word lies in its top-level, surface definition, has also been rejected by recent research (Goodman & Goodman, 1978; Harste, Burke, & Woodward, 1982; Anderson, 1977). We now know that knowledge is always, to a certain extent, idiosyncratic; it is built from the inside out. Knowledge is based on individual experiences and shaped as learners fit these experiences into their own individual frameworks for understanding the world. People continually make sense of the world using their existing knowledge to interpret new information. Being able to make sense of the world involves not merely using terse language to frame a definition, but describing and elaborating concepts by linking them to other understandings. If a student has had no experience with a particular concept, a definition will make no real sense unless it can be linked to what is already known. These links help learners make sense from the inside out, from their home-talk world of personal language and

experience to the school-talk world of academic thought and technical language.

Comprehension research has consistently confirmed these basic tenets. Readers must be active constructors of meaning if they are to understand what the author is saying. The students themselves must make the connections; no one else can make them for them-- because no one else shares the personal knowledge an individual uses to makes sense of the world. And thus, hard as we try, no one but the student can fashion the links that will be meaningful.

Words vs. Concepts

In the vocabulary-review scenario presented above, none of the students considered what they already knew about the concept "democracy." Instead, they tried to guess what their teacher expected, if they tried to respond at all. Unfortunately, such activities fall short of preparing students to read their texts with greater comprehension. First, vocabulary words are chosen because they are "new." That is, they are not in the students' reading or speaking vocabularies. The rationale for choosing the words to be taught is simply that they are unknown and, if taught, they will then be known. No credence is given to the fact that the words represent whole networks of concepts that may be necessary to understanding the text. Surely, simply knowing that democracy is a form of government, or even knowing that

it is a form of government by the people exercised either directly or by representation, will not get a student very far in a history text unless the principles underlying societies, governments, and forms of rules and laws are also understood.

Another problem with vocabulary-review activities is that they often present a large number of words. This may seem reasonable if words selected for review are seen as members of a word bank, but not if they are simply labels for underlying complicated concepts. While ten new labels may not be too many, ten new concepts are likely to be overwhelming.

Imitation Discussion and Instructional Dialogue

Beyond the issue of what and how much is presented in a pre-reading activity lies the problem of communication between teacher and students. Outside the classroom, when we want to discover what someone knows about a given topic we generally would say something like, "What do you know about sky diving?" or "Do you know anything about wind surfing?" This reveals that the questioner would like to know more about the topic-- and expects a meaningful response either indicating lack of knowledge or a report of known information. The person questioned is likely to respond with the requested information, and the person who initiated

the question is likely to continue the conversation with a request for elaboration or further information (i.e., "You mean you use your body weight to turn the thing?").

Unlike real life discussion where the participants work together to make sense, classroom discussion is often more limited; the participants do not seem to use conversation in a cooperative learning enterprise. Instead, the discussion becomes an "imitation" of real conversation. If a student is asked, "Can you tell me what democracy means?" the student will usually assume that the teacher has a particular response in mind, and that some sort of judgment about the student's knowledge will be made based on the response. This expectation calls forth a different type of thinking, a different type of conversation, and a different type of response than is found in our real life example. No longer do the persons questioned search their memories for what they may know about the topic. Instead they try to fashion an "appropriate" response--a recitation of what they have learned--for which they will be evaluated favorably.

Early in their school careers, students learn that only certain type of responses are likely to bring favorable evaluations-- these generally contain school-type, academic language. James' response, "a form of government...," is typical of the academese students learn to adopt when in school. Teachers, because they have been trained to focus

on the content being taught (if not learned), unconsciously listen for academic language, and react positively to it when they hear it. School language often makes it seem as though students know the concept when in fact all they demonstrate is that they can use academese effectively. Too often we stop here instead of probing further. This keeps us from understanding what know and how deeply they know it.

The PReP

The PReP was developed to foster an instructional dialogue that differs in intent and communicative result from the activities we have been describing. PReP is directed by a real desire to hear what the students know. This intent shapes the language used by the teacher and by the student.

The PReP is a diagnostic/instructional activity which is the product of extensive research (Langer, 1980, 1981, 1982, 1984b; Langer & Nicolich, 1981). It is based on three theoretical notions:

(1) Knowledge about a topic influences how well a text will be understood. What a person knows, how well that knowledge is organized in memory, and how it will be used during reading are all somewhat idiosyncratic, based on personal knowledge and experiences.

(2) The instructional environment influences the

background knowledge and strategies readers use when they read a text. When teachers and students focus on what they understand rather than on right answers, real communication is more likely to take place.

(3) Better comprehenders monitor their comprehension. They:

(a) are aware of what they do and do not know;

(b) understand the task demands;

(c) can judge whether a bit of information might or might not be text related;

(d) can take steps to increase the likelihood of understanding the text.

The PReP is a three-step activity which is useful for both instruction and assessment. Presented before students begin reading their texts, the plan helps the teacher determine: (1) how much background knowledge a student has about a particular topic and how that knowledge is organized; (2) the language a student uses to express the knowledge; and (3) how much concept teaching (if any) may be necessary before the student is likely to comprehend the text. Instructionally, the activity helps students: (1) become aware of what they already know about the topic; (2) build on this knowledge in the context of the group's elaboration of related language and concepts; and (3) refine

predictions of what the content of the text will contain--which will facilitate learning from the text.

Preparing for PReP

Before beginning the discussion, the teacher needs to review the text to be assigned and choose three to five key concepts which can be represented by a word, phrase, or picture. For example, if the text deals with the branches of government, "congress" might be one of the concepts selected. A picture of the Supreme Court in action might also be presented.

Three Phases of PReP

Phase 1. Phase 1 is basically a free-association task. In this phase, initial associations with a particular concept are elicited.

> The teacher says, "Before we read about the United States' form of government, tell me anything, anything at all, that comes to your mind when ... (you hear this word, see this picture, etc.)."

As the students respond, the teacher writes their associations on the board, overhead projector overlay, or chart paper. It is important that all responses be accepted in a nonjudgmental manner. Also, the students should be

encouraged to think of as many ideas as they can about the concept.

Phase 2. When all students have had an opportunity to respond, the teacher begins the second phase of the activity which involves reflecting on the initial associations.

> The teacher asks each student, "What made you think of ...?"

The point of this is to help students become aware of what they know, and to judge if it is likely to relate to the text they will soon read. They also reflect and build upon what they already know through listening to and interacting with the teacher and the other members of the group.

Phase 3 During phase three of the activity, the students are given an opportunity to reformulate their ideas.

> The teacher asks, Based on our discussion, have you any new ideas about ... the word, the picture, etc.)?"

The students now can shape, through language, associations which have been elaborated or altered as a result of the discussion. Because they have had an opportunity to probe their own memories, listen to others, and reflect upon this process, the responses elicited during

this phase are often more refined than those elicited during the first phase.

From the beginning, students are aware that they are doing the PReP because they are about to read about a particular topic. The entire activity takes place in the context of the to-be-read material. However, this does not mean that as Phase 3 concludes, they are asked to predict what the text will say. Rather, they are pointed in the direction of the text, and the ownership of the knowledge remains theirs.

In summary, then, the three phases of PReP involve: (1) initial associations with the concept; (2) reflections on these initial associations; and (3) reformulation of knowledge. Figure 1 portrays these three phases graphically.

Insert Figure 1 about here

Assessing Student Knowledge

Student responses will generally fall into three categories which can be used by the teacher to assess the complexity of the students' knowledge. Previous studies have shown these categories to be good predictors of students' recall of a particular passage and to be independent of IQ and overall reading ability (Langer, 1980;

Langer, 1984 b; Langer & Nicolich, 1981).

Much Prior Knowledge. Students will be displaying much prior knowledge about a concept if they respond during Phase 1 with superordinate concepts, definitions, analogies or linkages with other concepts indicative of high-level integration of ideas. They will show an encompassing knowledge of the topic.

Some Prior Knowledge. Some knowledge about the topic is reflected in responses which take the form of examples, attributes, or defining characteristics. Students will know bits of information about the topic.

Little Prior Knowledge. Little prior knowledge is indicated by responses which focus on low-level associations, morphemes, "sound alikes," or somewhat irrelevant first-hand experiences. This sort of knowledge is peripheral and diffuse. (See Figure 2 for examples of responses at each of the three levels.)

Generally, students with much prior knowledge are able to comprehend the text without assistance, those with some prior knowledge may need the watchful eye of the teacher to help them along the way, and those with little prior knowledge are in need of direct concept instruction before they can be expected to comprehend the text. Of course, some texts use such convoluted sentence structures or such abstract language that they create processing problems even

for students who know a good deal about the topic.

Insert Figure 2 about here

Examples of PReP In Use

The remainder of this chapter will be devoted to examples of the PReP being used with several different types of reading material at different grade levels.

Grade 5: Social Studies

A fifth-grade class was about to read a section of their social studies text which dealt with the U.S. form of government. Their teacher was concerned about the heavy concept load of the chapter and wished to find out what the students already knew about the topic. The teacher previewed the chapter and chose three basic concepts. A portion of the PReP activity which followed is presented below. The categorizations of the students' responses are listed along the right margin.

Key Word: congress

Phase I

Teacher: Before we read the next section of our social studies book about the U.S. Government, I want each of you to tell anything, anything at all that comes to your mind when you hear the word, "congress."

(As the students responded, the teacher wrote their

responses on the chalkboard. Each response was accepted in a nonjudgmental and interested way by the teacher.)

Bill:	A part of our government where they make the laws.	Much: definition
Megan:	It's in Washington, D.C.	Some: attribute
Gabe:	A law-making body of government.	Much: superordinate/definition
Alan:	On T.V.	Little: Association
Jennifer:	Makes laws	Some: defining characteristic
John:	Congo	Little: morphemic association

Phase II

Teacher: Now I'd like you each to tell what made you think of what you said. Megan, you said, "It's in Washington, D.C." What made you think of that?

(Each of the students was asked in turn what made them think of their individual responses.)

Megan My dad went to Washington, D.C. on a business trip a couple of months ago. He brought pictures back and he told us about how he went to see the White House where the President is and he went to see the congress.

(Through this discussion, Megan was able to connect what she had learned from her father, complete with his personal impressions, with the concept of "congress" about to be met

in print.)

Gabe: I was thinking about all the parts of our government. I picture congress as the part that makes the laws.

(Alan was also able to explore and expand his thinking as he talked about how he hears and sees news about congress on T.V.)

Phase III

Teacher: Now that we have talked about this and before we read the text, do any of you want to add to or change what you have said about "congress?"

Megan: A group of elected people
who meet in Washington, D.C.
to debate and make laws for
the country. Much: definition

(Megan was thus able to give a more precise definition of the concept. Her memory of what she had heard from her father which she had connected to what had been said in the discussion by other members in the group helped her to do this.)

Alan: Important people argue
about what the ... Some: attribute

(Alan was able to expand on his memory of hearing about congress on T.V. by recalling some of the issues surrounding

the T.V. announcements.)

Through this activity, the teacher was able to assess what each student knew about the social studies material they would read. The teacher decided that Gabe and Bill were well-prepared to read the assigned chapter. Megan could probably read the material successfully, but Jennifer would need extra help to link what she knew to the content of the chapter. Alan and John would need some additional instruction on the concept itself before they could be expected to comprehend the social studies text (see Pearson & Johnson, 1978, for suggestions for concept instruction).

Grade 8: Science

In another classroom, at the eighth-grade level, a science class was about to read about "photosynthesis" in their texts. The teacher preceded this with a PReP activity to help the students recall and organize what they already knew about this concept and to determine which students were ready to read the material. The portion of the activity below focused on the concept of "photosynthesis.", Other key words selected were "cycle" and "oxygen."

Key word: "photosynthesis"

Phase I

Teacher: We're going to be reading about a process called "photosynthesis" in our books. I'd like you to tell anything that comes to mind when you hear the

word "photosynthesis." I'll write what you say on the board. Anyone?

(During this phase it became apparent that none of the students had much knowledge of the concept. The following is typical of the responses.)

Joan:	Sun shining on a plant.	Some: defining characteristic
Jack:	photograph	Little: morphemic association
Marian:	pictures	Little: morphemic association
Zachary:	Something to do with science	Little: association

Phase II

Teacher: Okay. Now I'd like each of you to think about what you said and to try and tell us what may have made you think of that response.

Joan: I remembered reading in a book about photosynthesis. There was this picture that showed rays coming out of the sun and going down to a plant. I just remembered the picture when I heard that word.

Jack: "Photosynthesis" sounded like "photograph." The first part of it anyway.

Marian: Yeah. I thought at first you said "photograph" and that made me think of "pictures."

Zachary: I just remembered hearing the word in another

science class.

(During this discussion, the teacher helped the group see that they did know something about the concept. A discussion grew out of the meaning of the "photo" morpheme and how that would be related to the sun and plants idea. This helped all of the students refine their responses in Phase III and helped some of them raise the level of their responses.)

Phase III

Teacher: Now that we've been thinking about this for a while, do any of you want to change or add to your previous responses, before we read about photosynthesis?

Joan:	It is when the sun shines on plants and that helps the plants give oxygen.	Much: definition
Zachary:	Sun and plants	Some: defining characteristics

(Jack and Marian stayed at the Little prior knowledge level but refined their previous responses by adding "light" which they may have connected to their earlier "photograph" responses due to the discussion during phase II.)

The teacher concluded that although Joan could successfully read the text, the others needed help building the concept from what they knew before reading about it.

Jack and Marian were helped to see that they already knew about the morpheme "photo" and the role of light in the process of photography. They then could extend this knowledge to the role of light in the process of photosynthesis. Of course, further concept teaching took place but always beginning with the students' own knowledge as displayed through their own language.

Grade 11: Literature

Our final example of the PReP comes from an eleventh-grade literature class. The class was about to read a series of selections which deal with the concept of "justice." Their literature selections included excerpts from The Book of Job and Dante's Inferno. In addition to selecting the concept of "justice" for the PReP activity, the teacher had also chosen the key words of "fairness" and "retribution."

Key Word: "justice"

Phase I

Teacher: Tell me anything you think of when you hear the word "justice."

(As the students responded, the teacher recorded their comments uncritically on an overhead projector overlay. The students all seemed to possess at least Some knowledge of the concept.)

Alice:	Being fair	Some: defining characteristic
Carol:	It's when a murderer is caught, tried, and executed	Some: example
Jason:	When my mother believes me when I tell the truth even though it looks like I might be lying	Some: example
Robert:	Fair handling--due reward	Much: definition
Melanie:	A basic concept underlying our system of law. No matter how rich or poor you are, you are treated equally in the eyes of the law.	Much: linking

Phase II

Teacher: Now I'd like each of you to tell how you thought of your associations to the word "justice." What were you thinking of when you chose your responses?

Robert: I was thinking about how my parents try to reward us when we deserve it and to punish us when we deserve it. That seems just. Also, other authority groups should do the same--schools, employers, govenments, courts.

(Note that this part of the activity gave the teacher a

chance to probe Robert's initial bookish definition to see if he did, in fact, understand the concept of "justice." From his response to this probing, it became apparent that Robert had given a great deal of thought to the concept of justice.)

Carol: Whenever I hear the word "justice" I always think of crime shows and people being punished by the courts.

Phase III

Teacher: Now that you have had a chance to reflect on your thinking about this term, do any of you wish to add to or change your original response?

Jason: Means getting what you deserve Much: superordinate

Carol: Getting punished if you are guilty and not getting punished if you are innocent Much: superordinate

Before allowing the students to begin reading, the teacher helped them all to see that they possessed quite definite ideas on the concept of justice based on experiences in their own lives. When they thought of these experiences and ideas and reflected upon how the ideas were formed in their minds, they were ready to learn and assess how the Bible treats the subject and how Dante treats it.

These three instances of the classroom use of PReP

demonstrate its application at different levels with different topics. The principles behind its use make it quite useful in all subject areas: it provides a way for students to become aware of what they know about a given topic and to reflect and build upon that knowledge. It also gives the teacher a way to assess the degree of knowledge students already have particular topic. It does this in such a way that students are not led into giving "canned" responses with little meaning behind them.

As teachers, we all can recall instances, like the science example above, when the content and language of the text was far from the experience of our students. Our dilemma is to bridge the gap in a substantive way. This involves helping students become aware of what they already know and then helping them build on that knowledge so that they can use their knowledge to gain new knowledge.

We also can recall situations like the example from the literature class where we knew our students had a great deal of experience to bring to the text. The task here is to help students recall those experiences and reflect upon them so that they are consciously assimilating the written material through the filter of their own relevant knowledge.

How we, as teachers, approach what our students already know leads in turn to how they will approach their texts. To help students use what they already know, classroom

discussions need to give room for students to tell what they know, in their own language. PReP is one way to accomplish this.

References

Anderson, R. C. (1977). The notion of schemata and the educational enterprise. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, NJ: Lawrence Erlbaum.

Goodman, K., & Goodman, Y. (1978). Reading of American children whose language is a stable rural dialect or a language other than English (Final Report, Contract No. 001-13--0087). Washington, DC: National Institute of Education.

Harste, J. C., Burke, C. L., & Woodward, V. A. (1982). Children's language and the world: Initial encounters with print. In J. A. Langer and M. Smith-Burke (Eds.), Reader meets author/bridging the gap. Newark, DE: International Reading Association.

Langer, J. A. (1980). Relation between levels of prior knowledge and the organization of recall. In M. Kamil and A. J. Moe (Eds.), Perspectives in reading research and instruction. Washington, DC: National Reading Conference, 28-33.

Langer, J. A. (1981). From theory to practice: A pre-reading plan. Journal of Reading, 25 (2), 152-156.

Langer, J. A. (1982). Facilitating text processing: The elaboration of prior knowledge. In J. A. Langer & M. Smith-Burke (Eds.), Reader meets author/bridging the gap. Newark, DE: International Reading Association.

Langer, J.A. (1983). Reading, Writing, and Reasoning: Making Connections. Paper presented at International Reading Association, Anaheim, CA, 149-162.

Langer, J. A. (1984a). The effects of available information on responses to school writing tasks. Research in the Teaching of English, 18 (1), 27-44.

Langer, J. A. (in press). Examining background knowledge and text comprehension. Reading Research Quarterly Urbana, IL: International Reading Association, 19 (4), 468-481.

Langer, J. A. & Nicolich, (1981). Prior knowledge and its effect on comprehension. Journal of Reading Behavior, 13 (4), 373-379.

Neisser, U. (1976). Cognition and reality. San Francisco: W. H. Freeman & Co.

Pearson, P. D. & Johnson, D. (1978). Teaching reading comprehension. New York: Macmillan.

Piaget, J. (1954). The construction of reality in the child. (M. Cook, Trans.). New York: Basic Books, Inc.

Rumelhart, C. (1977). Toward an interactive model of

reading. In S. Dornic (Ed.), Attention and Peformance VI. London: Academic Press.

PHASE	TEACHER	STUDENTS
I	"Tell me anything you think of when you hear...."	free associate/access prior knowledge
II	"What made you think of...."	reflect on thought processes, organization of knowledge
III	"Do you want to add to or change your first response?"	reformulate and refine responses

Figure 1. Three phases of PReP

MUCH

superordinate concept - higher class category
e.g., fascism - "one of the various forms of political rule..."

definitions - precise meaning
e.g., dictator - "a ruler whith absolute authority over the government of a people"

analogies - substitution of comparison for a literal concept or expression
e.g., court - "court is the scale that weighs your destiny"

linking - connecting one concept with another
e.g., congress - "congress is like parliament in that both..."

SOME

examples - appropriate class, but more specific
e.g., government - "dictatorship"

attributes - subordinate to larger concept
e.g., court - "trust in the judgment of others"

defining characteristics - defines a major aspect of the concept
e.g., government - "makes laws"

LITTLE

associations - tangential cognitive links
e.g., congress - "important people"

morphemes - smallest units of meaning such as prefixes, suffixes, and root words
e.g., binary - "bicycle"

sound alikes - similar phonemic units
e.g., gerrymander - "salamander"

first hand experiences - tangential responses based on current exposure
e.g., Iran - "news on television"

no apparent knowledge

Figure 2. The organization of Topic Specific Knowledge